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# THE PROFESSION OF FORESTRY.

BY

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FORESTER.

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# THE PROFESSION OF FORESTRY.

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## RAPID DEVELOPMENT OF FORESTRY IN THE UNITED STATES.

During the last decade forestry in the United States has developed with remarkable rapidity. The inauguration of forest management on the National Forests, the activity of various States in public forestry, and the increasing interest of private owners in timber growing and protection have resulted in a marked demand for trained foresters.

When active work in forestry first began there were no forest schools in the country, and those entering upon the work were obliged to go to Europe for technical training. In anticipation of the need for foresters, and in order to aid in the development of forestry, several progressive institutions established schools of forestry even before the demand for any considerable number of men was definitely assured.

The first professional school was established at Cornell University in 1898. This was followed in 1900 by the Yale Forest School. Private instruction in forestry was given at Biltmore, North Carolina, by Doctor Schenck in connection with his work on the Vanderbilt estate as early as 1897, and a school for rangers was started by the State of Pennsylvania at Mont Alto, Pennsylvania, in 1903. Since that time instruction in forestry has been introduced in a large number of institutions. To-day there are 22 institutions which give courses leading to a degree in forestry, and about 40 others which include forestry in their curricula. It is estimated that there are fully 500 men in the United States with a greater or less degree of technical training, in addition to 1,500 forest rangers who began without a knowledge of the technical side of forestry, but many of whom through their experience in National and State forest work under technical direction have acquired considerable knowledge of certain phases of the subject. There are probably about 1,000 young men studying in the forest schools.

Forestry may therefore be considered an established profession in the United States. Hundreds of young men are considering it as a life vocation, and are eager to be informed regarding the character of work involved, the elements necessary for success, the requirements for an adequate training, the present and probable future opportunities for work, and its possibilities as a means of livelihood.

## FORESTRY AS A VOCATION.

### LIFE OF THE FORESTER.

Although forestry is now a recognized profession, perhaps a majority of the people in this country still have only a vague idea as to the kind of life the forester really leads. Many young men are attracted to it because it is an outdoor profession. They are fond of camping in the woods, of fishing, and of hunting, and the prospect of being able to spend a part of each year in the woods in connection with their regular work seems very alluring. Such men should remember, however, that the forester in his field work is seldom able to enjoy the comforts to which the ordinary sportsman is accustomed, and that spending considerable time in the woods as part of one's regular business is very different from camping out for a few weeks on a vacation.

Any one who plans to take up forestry should realize at the outset that his work is to be principally in the woods, often under trying conditions. This is particularly true during the early days of his work, when he is serving his apprenticeship, and as the number of foresters increases and competition becomes more intense, this period may be expected to lengthen. The young forester is also apt to have his headquarters shifted frequently from place to place, as is the case with civil engineers, so that he may be unable for some time to establish a home.

On the other hand, if he is an able man, he will ultimately be advanced to a position of responsibility which will give him more permanent headquarters and a greater opportunity for home life. Even in the higher positions, however, whether in government or in private work, the forester will be obliged to spend a great deal of time in supervising the actual woods operations on the ground. In the aggregate he will usually spend from 40 to 60 per cent of his time in the field, mainly on short trips of from one to six weeks, and the rest of his time in the office. His home will ordinarily be in a small town or its vicinity, with but little opportunity for city life. Even here he must not count himself secure against a change of working field which will necessitate removal to a new place.

To one who enjoys a life of this sort, the profession is fascinating; to one who does not, the work soon becomes monotonous and even positively disagreeable.

The character of work which the forester is called upon to do varies greatly under different conditions. Some men spend the greater part of their time in the more strictly technical work of the profession. They study such problems as the determination of the amount of merchantable timber on a given tract, its rate of growth, the best methods of cutting to secure a second crop without recourse to planting, and, in general, all problems which deal with the life history and production of the forest. Other men spend more time on the business end of the profession, in devising methods of protecting the forest from fire, in organizing an efficient system of administration, in determining the cheapest and most effective methods of lumbering, and, in general, in dealing with the problem of the utilization of the forest.

By far the greater number of foresters, however, have to deal with both the scientific and the business aspects of the profession. They must know how to appraise the value of timber and how to utilize it in the best possible way, as well as how to grow it. They must be able to estimate how much it will cost a thousand feet to log a given tract of timber, at the same time that they predict how soon it will be profitable to cut the same area again. In other words, the average forester must be a good business man, with a thorough technical education. The scientific equipment is simply a matter of thorough schooling; the business equipment must be secured by practical experience in woods work.

Many of the men who prepare for forestry should anticipate employment with lumber companies. This will usually require several years of hard work in the woods, in logging camps, or at the mill, in relatively subordinate positions, to learn the practical details of the business. This apprenticeship is essential before responsible or attractive positions can be secured, and indeed before a forester can apply technical methods of management to the business intelligently, or can acquire the confidence of his employers so that his recommendations will be followed.

## REQUISITES FOR SUCCESS.

The first requisites for the successful forester are that he have a liking for the sort of life which he will have to lead, and that he possess the health and constitution to stand it. The forester's work is physically exacting. He has to make long, hard trips in the forest, and under present conditions and those which will continue for a long time to come travel is necessarily rough. Sometimes it means a long trip on horseback, sometimes by canoe, and sometimes very hard and rough walking. The forester is not infrequently subject to actual physical hardships, and in any event he must have the constitution to endure such hardships should the occasion arise.

It must not be understood from this, however, that the profession is a muscular one, pure and simple. It requires brains, and brains of a high order, particularly at the present stage of the profession in this country, when nearly every forester is doing distinctly constructive work. The successful forester must have to a large degree the qualities of foresight and broad-mindedness, and these must be supplemented more and more, as the work becomes better organized, by a thoroughness in details. The man who is capable only of carrying out some one else's plans will always remain an assistant.

Another prime requisite for the forester is administrative and executive ability. His work is extremely practical, and is either directly or indirectly concerned with the practical business administration of property. As soon as he passes beyond the state of being a mere assistant he has charge of men, and to be successful must have the ability to understand and to manage them. This applies particularly, of course, to men engaged in administrative work, as are most of the foresters in this country at present. Even in strictly investigative work, however, where the forester has no direct administrative responsibility, he is doing work which is essential for the proper handling of the forest, and must be thoroughly practical if his investigations are to be of value in securing better methods of forest management.

In addition to executive ability many foresters must have those qualities which go to make up a public teacher. Nearly every forester, whether consciously or not, is helping to mold public sentiment, and in many positions educational work is a part of his regular duties. This is often the case with the first work of a State forester, who must be able to present his message by public addresses and public writings. This requires a certain amount of address and confidence, and the ability to formulate concise and effective arguments.

One of the most important requisites for success, particularly in this country, is the spirit of public service. The conservation of our natural resources is the greatest internal problem before the country to-day, and forestry touches the conservation of all our natural resources. Every forester is doing a work which directly benefits the public. It has been a difficult task to accomplish what has already been done in forestry. It will be a still more difficult one to carry the work to completion. The public forester has many obstacles to overcome, and his financial returns are small; but his opportunities for public service are correspondingly great. His reward ought to be very largely in the satisfaction of doing a constructive work which profoundly affects the prosperity of his country. It is this spirit of public service which is keeping in Government forest work to-day men who are repeatedly refusing offers of private work with much higher salaries than they are receiving from the public.

A final requisite for success in forestry, as in any other profession, and one which can not be overestimated, is a fundamental and thorough training for the work. As the number of foresters in the country steadily increases, and competition becomes more keen, the necessity for a thorough education will grow more and more urgent.

## NECESSARY TRAINING.

The thoroughly trained technical forester should have an education equivalent to that of any other well trained professional man, such as a lawyer, or doctor, or civil engineer. Such an education can not ordinarily be obtained in less than four years of college work. A course of five or six years, one or two of which are spent in post-graduate work, is still better. There is now a great abundance of well equipped forest schools in this country, offering both undergraduate and post-graduate work, and the average man can not hope to be successful in the profession without a complete course in one of these schools. The more practical field experience he can secure in addition to this, the better prepared he will be. For the large number of men who will look for employment to the lumbering business or other forest-using industries a thorough training in the principles of forestry, through four or five years of college work, is as necessary as in the case of men who plan to specialize upon the more scientific and technical sides of the profession. Such training, however, is but one part of the needed equipment. It must be supplemented by first-hand experience in lumbering operations.

While post-graduate work in Europe is not essential, it is a valuable asset to the man who can avail himself of it. Conditions here are so different from those in Europe that many of the methods commonly used there are wholly impracticable in this country. At the same time the profession has become so thoroughly established and has accomplished so much there that a careful study of European forestry can not fail to be suggestive and of much practical value to the American forester.

Closely allied with work in technical forestry is that of the forest ranger. The ranger will not be called upon to do such technical work as the professional forester, and does not need so much schooling. His work is of an exceedingly practical nature, and if he can work under some instruction he can pick up a great deal of the empirical knowledge which he needs along technical lines. Most forest rangers to-day have received their early training through long experience in the woods. Such experience is essential for the efficient ranger, but in addition it is extremely desirable for him to have a practical course at some ranger school. His usefulness and his chances for promotion are greatly increased if he can spend even two or three months taking such a course, for example, as that now given at a number of our western universities. Up to this time educational institutions have devoted much less attention to training rangers than to training technical foresters. At present only a few ranger courses are given in the entire country, and these are more in the nature of short courses than a full ranger training. Better facilities for obtaining the education needed by a ranger will undoubtedly become available in the near future. A well-rounded ranger course should cover a period of about one full year, and should be conducted primarily in the field along very practical lines.

## THE FIELD OF WORK.

Foresters are now finding employment with the Federal Government, with various States, with lumbermen and other private owners of timberland, and with educational institutions and those conducting research in forestry.

### GOVERNMENT WORK.

So far the United States Government has been the principal employer of foresters. It is probable that fully 95 per cent of the trained foresters in the country have at one time or another been engaged in Government work, and 60 per cent or more are in it to-day. There is a small group of foresters in the Indian Office in the Department of the Interior, who are in charge of the forests owned by the various Indian tribes, and more foresters will undoubtedly be employed by the Department of the Interior when the National Parks are placed under technical administration. At present, however, nearly all of the forestry work of the Federal Government is conducted by the Forest Service in the Department of Agriculture. The work of the Forest Service may be divided into two parts: First, the administration and protection of the National Forests; and, second, technical investigations and cooperation with States and private owners.

#### ADMINISTRATION AND PROTECTION OF NATIONAL FORESTS.

The National Forests cover a gross area of nearly 190,000,000 acres, situated chiefly in the mountains of the West. The administration and protection of this vast domain constitutes the greatest task of the Forest Service, and occupies the time of most of its men. The administration of the National Forests is centered in the Washington office, to which are attached certain higher officers engaged in general direction and inspection of the work. For convenience in field administration there have been established six National Forest districts, each in charge of a District Forester, who has associated with him such technical assistants as are necessary for the conduct of the work. Each District Forester has supervision over the administration of the group of Forests, usually from 20 to 30, which are located within his District.

Altogether there are 162 Forests, averaging over 1,000,000 acres each. In charge of each Forest is a supervisor, who may or may not be a technical forester. In some cases he is assisted by a deputy supervisor. The Forests are divided into districts, each in charge of a forest ranger, who is responsible for the protection of this area and for the conduct of the local business upon it. During the summer additional rangers and guards are employed to supplement the regular force. In addition to this executive force there are technical assistants to aid in scaling, in timber estimating, in surveying, in grazing, in land classification, and in other work which requires special technical knowledge and ability.

The following table shows the classification of the force on the National Forests on June 30, 1912, not including men in the District offices:

| | |
|---|---|
| Supervisors | 151 |
| Deputy supervisors | 100 |
| Rangers | 1,424 |
| Guards | 526 |
| Forest examiners and forest assistants | 129 |
| Timber and mining experts, engineers, land examiners, hunters, etc | 112 |
| Clerks | 182 |
| Total | 2,624 |

The first task on the National Forests has been that of protecting them and of organizing their business administration. Protection of the Forests from fire is of fundamental importance, and every effort has been directed toward this end. Not only have patrolmen been employed to be on the lookout for fires, but all the permanent improvement work, such as the building of roads, trails, and telephone lines, has been planned with the specific object in view of making them of the greatest use in fire protection. In addition to this protective work, the constantly increasing use of the Forests has necessitated the handling of an immense amount of current business. During the fiscal year ending June 30, 1911, for example, 830 million board feet of timber were sold, and 7,400,000 head of sheep and goats and 1,400,000 head of cattle and horses were grazed on the National Forests. At the same time the Forests resources are used through permits for power development, irrigation, summer residences, hotels, and a great variety of other special uses.

All of these different lines of work are handled by the regular administrative force, under the immediate direction of the supervisor. From the very beginning an effort has been made to apply the best forestry possible under the given conditions, and the more technical phases of the work have accordingly been handled as far as practicable by the men with a technical education, the forest assistants. They have had to perform such duties as mapping and estimating the timber on the Forest, marking the trees to be removed in timber sales, raising stock at nurseries for field planting, and reforesting unproductive treeless areas either by planting or by direct seeding. The rangers also have been called upon to do work of this character, in addition to their regular work of protection and routine administration. Many of them have become very proficient in it, and will undoubtedly have more and more of it to do as the business of the National Forests increases. The next step in the development of the Forests is the preparation of detailed plans for the administration and use of their resources. These plans will place the management of the Forests on a far more definite and permanent basis, and both their preparation and execution will require technical ability of a high order.

### INVESTIGATION AND COOPERATION.

The investigative work of the Forest Service is of two kinds: That designed primarily to aid in the development of forestry on the National Forests, and that designed to aid in the development of forestry throughout the country. To accomplish the first of these purposes six forest experiment stations, similar in scope to the agricultural experiment stations, have been established on the National Forests in the West. These experiment stations are in charge of specialists, who devote their entire time to scientific investigations, the result of which will lead to better methods of forest management. For example, detailed investigations are now being carried on to determine the best methods of artificial reforestation under given conditions, the best methods of cutting in different forest types to secure natural reproduction, the rate of growth of trees left after lumbering, and similar studies. In addition to these experiment stations, investigative work is being done on the various National Forests by the technically trained men assigned to them. In this way a vast amount of information is being accumulated in all parts of the West, which will be of the greatest value in putting the management of the Forests on the best possible foundation.

The investigative work outside of the National Forests is conducted from the Washington office. The total force permanently engaged upon this work varies from about 20 to 30 men, with additional assistants during the field season. The work is designed to make available for private owners much the same information regarding their forests as the Government desires concerning the National Forests. Special studies are made of individual problems of importance, and the results are made generally available through publications.

Closely connected with the investigative work is the cooperation offered to private owners and to States. In States without a State forester, advice in regard to the best methods of forest management and in regard to planting is furnished by the Service to small timberland owners who are willing to pay the expense of the necessary examination. Work is also done in cooperation with the States in general studies of their forest conditions, in outlining State forest policies, and in recommending legislation.

The investigative work in forest products is largely concentrated at Madison, Wisconsin, where the laboratory of forest products is located. There are branch offices in Washington and in several of the District offices, and cooperative work is carried on at Seattle in connection with the University of Washington, and at Boulder, Colo., in connection with the University of Colorado. The total number of technical men engaged in investigative work in forest products varies from about 40 to 50. Of these, however, only a comparatively small number are technical foresters, the rest being engineers, chemists, and specialists in other lines. Very detailed studies are made of such problems as the preservative treatment of timber, the physical and mechanical properties of wood, wood distillation, the use of different species for paper pulp, and the decay of wood.

A new line of work recently undertaken by the Forest Service is the examination of land in the White Mountains and Southern Appalachian Mountains for purchase under the provisions of the Weeks Law. A force of about 30 technical foresters is engaged on this work, and temporary men are employed from time to time as occasion arises. Under the provisions of the Weeks Law assistance is also given to various States in protecting from fire the forested watersheds of navigable streams. This work requires the employment of several hundred Federal patrolmen to perform duties similar in a large measure to those of the ranger or guard on the National Forests.

### HOW THE FORCE IS RECRUITED.

All permanent positions in the Forest Service are in the classified civil service. The main force is recruited through two civil service examinations, that of forest assistant and that of forest ranger. The first is a highly technical examination, and requires a training equivalent to that given at the best forest schools. The ranger examination is of a very practical nature, requiring field training and experience, together with some knowledge of several phases of technical forestry. There are also a number of technical positions in other lines of work which are occupied by specialists recruited from special civil service examinations. Among these are mineral examiners, lumbermen, scalers, engineers in timber tests, chemical engineers, draftsmen, land examiners, land law clerks, and others.

The important positions in the Forest Service along executive and administrative lines are filled by the promotion of men who have shown special merit. Most of the forest supervisors and deputy supervisors are men who have been promoted either from forest assistant or from forest ranger.

With the exception of the Forester and the Associate Forester the salaries of the higher officials in administrative and investigative work in the Washington and District offices vary from $2,000 to $3,750 per year. The salaries of supervisors range from $1,400 to $2,700; of deputy supervisors from $1,400 to $1,700; of forest examners from $1,600 to $2,200; of forest assistants from $1,100 to $2,000; and of rangers from $900 to $1,500 per year.

The Forest Service force has increased within a comparatively short time from only a few men to a total of between three and four thousand. Until 1911 practically every person who passed the civil service examination for forest assistant was taken on the force. There is now, however, a complete administrative organization with a specified number of positions, and the future growth of the Service will necessarily be much slower. This has led to the general impression that unless there are very largely increased appropriations there will be no opportunity for new men in the Forest Service. In a sense this is true, because there will be but a small increase in the number of positions. At the same time it is likely that a certain number of new men will be needed every year. The Forest Service is a very large organization, and a new one, and a great many changes in personnel are occurring all the time. Doubtless it will ultimately be a very much larger organization than at present. It is inevitable that many of the Forests will be subdivided, as it becomes possible to make their administration more intensive, and that the investigative work will develop considerably.

For replacement in the ranks of forest assistants some twenty new men will probably be required each year. In addition there will be opportunity for a number of men to enter the Service as rangers, with the possibility of promotion later to more technical positions. Inasmuch as the high-grade forest schools are now turning out several hundred men each year, this means that the time has arrived when the Forest Service can no longer take care of all their graduates, and that a considerable number must look elsewhere for employment.

## STATE WORK.

During the last few years there has been a constantly increasing activity in forestry among the various States. Whereas only a few years ago not over half a dozen States employed trained foresters, to-day more than 20 different States have some kind of organization for forest work. These include the New England States, New York, Pennsylvania, New Jersey, Maryland, North Carolina, Kentucky, Ohio, Indiana, Michigan, Wisconsin, Minnesota, Kansas, Colorado, Montana, Idaho, Washington, Oregon, and California.

The character of work which a State forester has to do depends upon the stage of development of forestry in that particular State. In one where forestry is just beginning to receive attention, his first efforts must be largely along educational lines. Ordinarily he receives a small appropriation, and his chief task is to develop a forest policy for the State and to educate the people to a better handling of the forests within its borders. He must study the needs of the State, and then go before the people and show them what must be done to put into effect the policy which he has formulated. He usually has to make a great many public addresses, issue bulletins, write articles for the magazines and newspapers, and in every other way possible bring his message to the people. He must secure legislation and appropriations, and ordinarily has but little opportunity for doing technical forest work.

On the other hand, in those States where there is already a settled forest policy, the State forester's work is of a very different character. In such States the problem of fire protection absorbs a large amount of his time, and there is usually much administrative work to be done. Many States already have State forests, or are planning to acquire them. Their management naturally falls to the State forester, and gives him an opportunity to do some real technical work. Some of the States also, as, for example New Hampshire, Vermont, Connecticut, New York, Pennsylvania, Ohio, and Michigan, maintain nurseries for the production of plant material for distribution to citizens. The work of these nurseries must be directed by the State forester. Usually also he assists private owners in the management of their woodlands. This is done both by correspondence and by actual examinations of specific tracts, with recommendations for their management. All these duties give the State forester a wide scope for work along both administrative and technical lines.

Ordinarily the State forester is a thoroughly trained technical man. In some States where the work is just beginning to develop he is alone in the office, but more often he has one or more assistants. Not infrequently he has charge of a force of rangers, who are employed chiefly in fire patrol. In many cases he cooperates in this work with organizations of private owners and with the Federal Government.

The salaries of State foresters vary from $2,000 to $4,000 a year, but most of them receive about $2,500 a year. Their assistants ordinarily receive from $1,000 to $2,000.

Work in State forestry has just begun. It is possible to look forward to the time when every State with any forest interests will have an organization whose duty is to make the most of its forest resources. When this time comes there will be an active demand for men in State work, not only in the more responsible position of State forester, but also as assistants. It is true that this field is not unlimited, but it is nevertheless an extremely important one, and it will probably be a long time before it will cease to absorb a certain number of new men each year. For the immediate future the demand on the part of the States for trained men will probably be nearly as great as on the part of the Federal Government.

### PRIVATE WORK.

The timberlands belonging to private individuals are more extensive and more valuable than those publicly owned. Of the total stand of merchantable timber in the country, fully four-fifths is in private ownership. It is apparent, therefore, that the forest problem is not by any means confined to the public lands. Private forestry really offers the broadest field to the trained forester, and it is there that the profession may be expected to make the greatest expansion in the future.

Private owners may be classified in a general way as lumber companies; public service corporations, such as railroad and water companies; mining companies; recreation and hunting clubs; large private estates; and farmers and other small wood-lot owners.

So far the principal activities in forestry on the part of the large lumber companies have been in protecting their holdings from fire. In northwestern Montana, northern Idaho, Washington, and Oregon large lumber companies have taken a very progressive attitude toward the question of fire protection. They have organized timber protective associations, and have employed trained men to put into effect systematic plans for fire protection. Similar action has been taken by some of the lumbermen in the Northeast, notably in Maine and New Hampshire. In other parts of the country the work of fire protection has been largely carried on by the individual lumberman, and has been for the most part spasmodic and unsystematic. Nevertheless, there is a constantly growing appreciation of the need for such work, and systematic fire protection on the part of the lumber companies in nearly all parts of the country may be looked for in the near future.

Although there is a steadily increasing interest in forestry among lumbermen, relatively few foresters have as yet been employed by them. The technical work that has so far been done by the lumber companies has been elementary in character and of such a nature that it could be conducted by practical men already in their employ. The large companies in the far West have taken the position that fire protection is the problem of first importance and that all questions in technical forestry, including reforestation, must come second. A number of large paper companies in the East, however, have gone a step farther, and, in addition to protecting their holdings from fire, place a minimum limit upon the size of the trees cut in their operations. Some of these companies are even beginning to reforest their waste lands.

A big opportunity exists in the lumber industry for practical foresters with business ability. The forester who enters the lumber business must be prepared to estimate standing timber, appraise stumpage, determine the best method of cutting, estimate the future growth, lay out logging roads and railroads, and participate in actual lumbering and milling operations. As soon as foresters show their fitness for practical work of this character, there is no doubt that there will be a keen demand for their services. Fitness for this work will require entering the lumbering business at the bottom, and learning its practical and business details in a long and exacting apprenticeship. This field, however, offers probably the greatest opportunity for trained foresters in the future, both as to the number of men who will be required and the ultimate rewards for success, in salary and responsibility.

There is also a broad field among public service corporations which own timberlands. Most railroads own a certain amount of forest land, and the holdings of some, as the Northern Pacific, the Southern Pacific, and the Santa Fe, are very extensive. A few of these companies have already adopted a consistent and permanent policy of holding their timberlands, and are introducing systematic forest protection. The next step will be the inauguration of a system of forest administration somewhat similar to that on the National Forests. Some of the eastern railroads are considering the acquisition of forest lands, with tree planting wherever necessary, for the production of their own wood supplies, and the Pennsylvania, for example, has already put this policy into effect. So far the number of foresters employed by railroads is small, but the field is there, and ultimately will call for trained men.

Many water companies hold extensive tracts of timberland on the drainage areas from which their water supplies are derived. These companies have, for the most part, adopted the definite policy of maintaining such land in forest growth. They will unquestionably in many cases find it to their advantage to employ professional foresters to keep the forest cover in the best possible condition while at the same time yielding a revenue.

Frequently mining companies own lands which are covered with tree growth. Many of the mining companies in the southern mountains, especially coal mining companies, own considerable areas of land which they wish to hold for mineral development and also for the production of wood and timber for use in the mines. Some of these companies have already interested themselves in the question of treating timbers with chemical preservatives, and others have taken up the problem of conservative management of the forest land which they own.

Another class of private owners consists of those who have acquired forest property for hunting and other recreation purposes. Some of these owners are already beginning to practice forestry, and are employing foresters to take care of their property.

At present relatively few large tracts of land in private estates are administered under forestry principles with a technical forester in charge. More often the work on the ground is taken care of by a resident ranger or woods foreman, and where any technical work is done it is directed or supervised by a consulting forester who visits the tract only at intervals. Most of the forestry work so far done on private estates has been of this character, and except in the case of the largest owners will probably continue to be. Already there are a number of private firms and individuals with headquarters in New York, Boston, Philadelphia, and elsewhere, who do work as consulting foresters.

This phase of professional work will undoubtedly develop to a considerable degree, as the principles of forestry become better known and more generally recognized in the management of private woodlands. Work as "consulting foresters" will be the natural goal of many of the more mature and experienced men who have acquired a solid footing in the profession. It will also offer opportunities for the employment of younger men as assistants and members of field parties. Some of the larger firms of consulting foresters now established require a permanent staff of trained men to carry on their work. The number of such openings to foresters entering the profession will undoubtedly be materially increased in the future.

Artificial reforestation by private owners is now assuming considerable importance. Already approximately a million acres have been planted, and interest in the subject is steadily increasing. There is accordingly a profitable field for professional foresters in collecting seed and raising nursery stock, either as a business by itself, or in connection with other forestry work.

The development of private forestry in this country will depend in part upon favorable legislation with respect to taxation of growing timber and upon fire protection by the States, but in part also upon the individual work of the foresters themselves. If foresters prove practical and can demonstrate to an employer that their work is profitable, there is no question whatever that there will be plenty of employment. The field is there, and it is an enormous one. It remains only to be developed, and there is little question that the foresters who are being turned out in such large numbers from the various forest schools will solve the question, particularly when the development of such work is necessary for their own existence.

The compensation in private forestry depends entirely upon the earning capacity of the individual. Ordinarily foresters under salary will be paid for their technical work practically the same as public forest officers, and undoubtedly employers will take public salaries as the standard. Where the forester works into a regular business, however, as for example into the lumber business, his remuneration will depend more upon his business capacity and what he can do for the company in a business way than upon his technical attainments. Without any question some consulting foresters will be able to carry on a very prosperous business, especially when they have established a national reputation which will cause a demand for their services in the solution of particularly important problems.

### TEACHING AND RESEARCH WORK.

The vocation of teaching offers many advantages to the technical forester. While the field is a rather limited one, there are still many openings for men with practical field experience and ability as teachers. The comparatively large number of schools in this country now offering complete courses in forestry has demanded more men with experience than could readily be found, and it is not likely that this field will soon be overcrowded. The teacher of forestry has the advantage of being able to spend much of his time in the field and to carry on original studies in connection with the regular school work.

Closely associated with educational work is research work. So far this is an almost untouched field. There can be no question, however, that it is an extremely important one, which offers attractive opportunities to a limited number of suitably trained men. Carefully conducted scientific investigations must lay the foundation for all practical woods work, and the men who carry on these investigations are really guiding the development of forestry. These investigations must be not only along lines which have always been generally recognized as belonging to forestry, but also along such lines as forest entomology, pathology, meteorology, and soils. It can hardly be questioned that in investigations of this character a technical and practical training in forestry would be of especial value.

Research work will be carried on at educational institutions, by the Federal Government, to some extent by the individual States, and possibly at privately supported experiment stations. As in other scientific work the compensation will not usually be so large as for high-grade administrative work, but will undoubtedly be sufficient to afford a comfortable living.

Approved:
JAMES WILSON,
*Secretary of Agriculture.*
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